Research informing policy: an analysis of an emerging blockchain-enabled collaborative economy

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Blockchain technologies are commonly associated with cryptocurrencies, new markets around emergent currencies, and overall with the disruption of Finance. However, the untapered potential of blockchain lies in its capacity to enable the implementation of novel properties at an infrastructural level in a fully decentralized manner, impacting the governance of technological tools. We are currently witnessing the early stages of these emergent decentralized structures, and thus their future potential beyond the financial world is just starting to be explored. In the last years, there has been an emergent body of both projects and literature around the role of new forms of blockchain-based governance.

Two confronting standpoints dominate the emergent debate on blockchain and governance, which we may refer to as techno-solutionist and market-driven approaches, vs approaches supporting existing centralized institutions.

The first group often aims to solve social problems through the creation of new markets driven by their proposed cryptocurrencies. They show perspectives characterised by a high degree of techno-determinism. These perspectives envisage the emergence of new forms of blockchain-based governance on the basis of the potential of these technologies for decentralisation and trustlessness. These discourses typically inherently embed the idea of “market” and tend to ignore the complexity of social organization. For example, they commonly assume that hierarchies between the participants in decision-making processes vanish thanks to the disintermediation enabled by blockchain technologies (e.g. Swan 2015; Hayes 2016; Heuermann 2015). Overall, they tend to provide reductionist accounts with regards to the distribution of power, failing to acknowledge issues such as the generation of oligarchies or power dynamics (Freeman 1972; Shaw & Hill 2014; De Filippi & Loveluck 2016). There are abundant examples of techno-solutionist projects aiming to tackle social problems through new markets, such as Steemit commodifying social media interactions, the KodakCoin cryptocurrency to license Kodak photographs, or Mercury Protocol rewards to tackle online harassment.

The second, smaller group, opposes the first aiming to use blockchain technologies to strengthen centralized traditional institutions. Their critical stand

against these techno-determinist perspectives has successfully identified and criticised the limitations of such approaches (e.g. Atzori 2015; Atzori & Ulieru 2017). Nevertheless, this critique is built upon the reinforcement of the role of central authorities, resembling traditional responses against unregulated markets. In other words, these views consider traditional central authorities as inherently necessary to enable democratic governance and, as a result, ignore the potential for communities to successfully self-organise. By drawing on this assumption, the potentialities of blockchain are envisioned in non-transformative ways: to support the control required by traditional centralised forms of governance. For example, providing more transparency to their central institutions (Nguyen 2016), more efficient mechanisms to avoid tax fraud (Ainsworth & Shact 2016), or several banking consortiums such as R3.

Still, beyond this reductionist dichotomy, there is a third approach worth exploring: the one followed by Nobel laureate Elinor Ostrom[1], on the governance of commons. Ostrom's work demonstrated that communities managing common pool resources were more efficient than both Market and State managers, as long as they followed certain governance principles. Thus, this third approach relies on previous studies on the self-governance of common goods, enabling a perspective that does not rely on the logic of private markets, as implicitly assumed by the hegemonic blockchain perspectives, neither on the logic of centralised institutions, which the emergence of the blockchain originally reacted against. The current debate is evolving to welcome this third approach, as we can see in both recent research (Rozas et al 2018, Calcaterra 2018, Shackelford & Myers 2017, Howell et al 2019), journalistic articles (Wong 2019, Anderson 2019) and emerging blockchain projects embracing it, of which the most relevant is the Commons Stack project (Emmet 2019), with the support of Giveth (Decoodt 2019).

This line of work explores essential questions such as: which are the transformative potentials of blockchain technologies for more participatory forms of governance? Can we define relevant uses of blockchain beyond techno-deterministic, market-driven scenarios and traditional centralised control? And overall, how can blockchain technologies facilitate large scale cooperation?

These questions regarding blockchain-enabled governance directly relate to one of the blockchain promises: the emergence of Decentralized Autonomous

[1] American Political Economist, she was awarded the Nobel Prize in Economics in 2009 for her "analysis of economic governance, especially the commons", becoming the first woman to win the prize.

Organizations, or DAOs. A DAO is an organization[2] where the interaction of members (humans or machines) is mediated by a blockchain application, controlled only and exclusively by a set of immutable and incorruptible rules embedded in its source code. A DAO can be regarded as a digital organization mediated by a software agent[3], whose code is in the blockchain. As a decentralized organization, a DAO can *provide services* (or resources) to third-parties, or even *hire* people to perform specific tasks. Hence, individuals can transact with a DAO in order to benefit from the service it provides, or to get paid for a contribution they made. As opposed to traditional online platforms, DAOs do not rely on any central server and cannot be arbitrarily shut down by any single party (unless specifically provided for in their code). Thus, DAOs may be considered fully *autonomous,* to the extent that they do not need their original creator. Besides, a DAO may be considered *self-sufficient*, to the extent that they can charge users for their own services (or assets) in order to pay for the services they need. A theoretical example could be a DAO-Couchsurfing (Couchsurfing is a hospitality network where members stay in each other's house couches), which provides a public directory of places, and users can interact and even reward the hosts with reputational tokens.

A lot has been written on how the Web 2.0[4] has facilitated new forms of social organization and cooperation. At the same time, it has raised unparalleled control to a few large multinational corporations which act as owners of the enabling infrastructure. This has caused multiple issues around surveillance, privacy, accountability, exploitation, exclusion and monopolistic practices (Benkler, 2016, Greenwald 2014, Anderson & Wolff 2010). DAOs provide a new way for building online software platforms, in which the technical infrastructure is shared, enabling higher levels of democratization, transparency and accountability. Thus, the promise of a Web 3.0[5] enabled by blockchain governance could potentially enable the benefits of boosting cooperation from Web 2.0 without several of its main core caveats.

Such promise has attracted multiple activists, nonprofits and “well-intentioned” actors to the field, and in particular to the creation of DAO-like organizations

[2] Considering “organization” as an entity comprising multiple people (or distributed applications) with a specific goal, not a legally registered organization.
[3] A software agent is a computer program with some degree of autonomy and agency, typically working continuously in a dynamic environment.
[4] “Web 2.0” or “Social Web” refers to the kind of websites that emerged since the 2000s, which emphasize user-generated content, usability, participatory culture and interoperability. We may think of Youtube or Facebook.
[5] The Web 3.0 is an emerging paradigm for websites relying on more decentralized technologies such as blockchain, together with disintermediation, automation, openness and profit sharing. In this context, it does not refer to the Semantic Web, which was sometimes referred to as Web 3.0 in the past.

supported by DLT technologies. It is true that, if such potentials were untapped, we can envision ecosystems of small organizations connected through automated systems, with DAOs automating some of the burdens of large-scale organization and facilitating the emergence of new International Organizations, Federations and Confederations. In such scenario, it would be possible, for instance: to have public institutions using freedom-respecting software providing services without compromising user's privacy (e.g. through the mathematical method of zero-knowledge proofs[6]); to have large-scale cooperation across non-profits validated by a network of trust in which each vouches for their known "friends"; to have new crowdsourced metrics of the multiple forms of value created by communities and social actors; to customize services beyond the current uniformity imposed by monopolistic software platforms, lowering the barriers for competition and opening the door to new forms of innovation by multiple nonprofit and for-profit actors; appropriate automatic rewarding of work, including previously invisible reproductive work. And all these forms of cooperation would be facilitated without having an owner of the infrastructure with absolute control over the network and its resources.

However, such beautiful utopic scenarios, brought by both techno-deterministic and commoners in different degrees, confront a reality in which decentralized infrastructure, especially for DAOs, are not yet ready for large-scale deployment. Ethereum, with its DAO concepts, was first proposed in 2013, and had its initial release in 2015. Since then, three large blockchain projects have promised to make DAOs a reality: Aragon, DAO Stack and Colony. They are undoubtedly moving forward, and e.g. Aragon has 1,300 prototype DAOs. Still, these projects development is slower than initially projected, and have suffered from multiple issues. In fact, the technical and social challenges have been greater than anticipated, including: scalability of Ethereum, that these projects rely upon; standardization and interoperability across blockchains and with existing systems; usability for non-geeks; large-scale fair governance issues which have challenged political scientists for centuries and free/open source communities for decades; legal issues such as GDPR-compliance; a profound lack of trained blockchain developer supply; environmental concerns with Proof of Work[7] algorithms… These challenges have slowed down development and expectations, and eventually caused that, 12 years after Bitcoin and 7 years after Ethereum, we still do not have widely successful DAO cases to look into.

[6] In Cryptography, a zero knowledge proof is a privacy-preserving method used to verify things without sharing or revealing underlying data, e.g. verifying a person has a valid driving license without accessing any of the license data.

[7] Proof of Work is a consensus mechanism, and an inherent part of the first blockchains like Bitcoin, which requires very high amounts of computation and thus of energy to be maintained.

Still, we cannot despise the whole field, since there is a wide diversity of worthwhile projects that can be considered "Blockchain/DLT[8] for social good", i.e. aiming for social impact. Our research group, in a collaboration with the European Commission's Joint Research Center, recently mapped the European ecosystem of such projects, and some of its figures may throw some light on the current state of the "DLT for Good" field.

The study (Hassan et al, 2020) accounted for 130 projects with functional software, within Europe. It shows that the top 5 European countries in number of initiatives are, in this order, UK (16%), Switzerland (14%), Spain (12%), Netherlands (12%) and Germany (10%). The majority of the projects (59%) rely on a for-profit company (often claiming to be social enterprises), and yet there is a high number of not-for-profit organizations (30%). This contradicts the overall image of innovative entrepreneurship being driven just by for-profits. We do observe a bias per country, e.g. with the UK having 87% of its projects catalogued as driven by for-profit enterprises, while EU countries having more similar percentage among nonprofits/for-profits.

As it is to be expected, these projects have emerged in the last 8 years, with a peak in 2017 (44%) -- correlated with the blockchain hype. They mostly (80%) rely on public blockchains (mostly Ethereum, 66%) rather than private DLTs (like Hyperledger). Thus, they are affected by the current technical problems of Ethereum with refer to e.g. scalability. Thus, it is naturally expected that technical advances in the infrastructure layer (commonly referred as "L1") will facilitate the work of this kind of projects.

It is worth noting 73% of the projects have their code in a Github repository, most of them with a free/open source license. In rates similar to the IT sector in general, women account for almost 30% of the workforce, although most of them in non-technical positions, and very few in co-founder roles.

Overall, these figures enable us to see points of intervention for Europe to facilitate the work of the emergent DLT for Good field that it's brewing within its grounds. It would be sensible to reinforce existing trends, as in: promoting free/open source projects and digital open commons in general; funding research to solve the infrastructural problems; supporting both for- and non-profit entrepreneurship (and not just the former); incentivizing diversity in technical teams; and aiding the consolidation of the emerging hubs already appearing in several European countries.

[8] DLT stands for Distributed Ledger Technology, which refers to systems in which data is shared and synchronized across multiple actors without a central mediator. Blockchains are a example of DLT.

Acknowledgements

The research behind this work was partially supported by the project P2P Models (https://p2pmodels.eu) funded by the European Research Council ERC-2017-STG (grant no.: 759207), and by the Expert Contract CT-EX2006C202176-110 with the European Commission's Joint Research Center. We would also like to thank Elena Martínez Vicente, Genoveva López Morales, Abel Figueras Aguilar and Christian Orgaz Alonso since this paper relies on their previous work and it wouldn't have been possible without them.

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Annex: 3 Key Policy Recommendations

1) Investing in the research and construction of free/open source decentralized technical infrastructure

The current Collaborative Economy is overwhelmed with monopolistic corporate US-based platforms causing a large number of issues (e.g. Facebook, Uber, Google, Airbnb). Europe is currently putting efforts in trying to have their own "European Unicorn"[9]. However, barriers for competition are very high in the current playing field, so it may be more sensible to change the rules of the game. That is, support the emergence of decentralized interoperable open source infrastructure where new ecosystems can thrive, providing customized services which are unthinkable nowadays. There are multiple technical and social challenges with respect to developing decentralized tech, and today there is a window of opportunity for Europe to boost the field and strengthen their position. It is already happening, with e.g. "Bloxberg" providing blockchain research infrastructure after an initiative from the Max Planck Library.

2) Strengthen EU hubs on decentralized tech, including not-just-for-profit, open and diverse projects

The mapping of the European ecosystem of DLT for Good has provided insights on the existing trends and projects already ongoing. Public institutions now have the chance to strengthen this ecosystem, aiding in the consolidation of the emerging hubs already appearing in several European countries. This should be done not just focused on for-profit entrepreneurship, but also on non-profit entrepreneurship, as the data shows has a strong presence in the EU. In fact, this has happened in the free/open source software world for decades in the USA (e.g. Mozilla Foundation, Apache Foundation, Free Software Foundation). In the same line, strengthening the existing trends on openness and diversity will give a clear advantage to teams aligned with European values in the international arena.

3) Promoting Platform Co-ops as emerging governance & business models

The Collaborative Economy facilitated by the centralized Internet has enabled large US-centric monopolies which act as central data hubs for the world population private data. However, as the Sharing Cities Declaration states, when considering policy, not all platforms are the same

[9] In Finance, a "unicorn" is a privately held startup company valued at over $1 billion. It is specially used in the Collaborative Economy field to refer to examples such as Airbnb or Uber.

(https://www.sharingcitiesaction.net/declaration/). With the emerging decentralized web, new possibilities open up concerning governance and business models. As opposed to the US, in Europe people are more used to participatory businesses and co-ops, and a 17% of Europe's population are members of a cooperative business. Today, there is an opportunity to support an emerging business and governance model, in line with decentralized tech: Platform Co-ops, i.e. platforms in which the users have a voice and a share of the profits, such as the German Fairmondo. There are already public initiatives to support, incubate and accelerate such projects, such as Barcelona City Council's "La Comunificadora".